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## Potential Biogas production on livestock operations

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### Potential Biogas production on livestock operations

Biogas is mixture of methane, CO<sub>2</sub> and other gases, produced from organic material, as livestock manure or other biological wastes, when fermented in the absence of oxygen. The animal production generates high discharge of organic pollutants, which are source of pollutants to soil and water, if not treated, being able to cause eutrophication of water courses. Biogas is considered to be a renewable fuel as it originates from organic material, and it could be a substitute for some high pollutant fuels as gasoline and natural gas. Although in many places around the world already exists several laws and policies in which Biogas production is incentivized, the United States are still struggling in some political issues. There are many reasons that leads me to think that biogas could be more widespread used as energy source.

Animal production is responsible for 10% of total greenhouse gases emissions around the globe (EPA, 2012). Moreover, because of the nutrient content in animal manure, may occur an algal bloom, and consequently it diminishes the oxygen present in water necessary to support aquatic life, causing a "dead zone". In the Gulf of Mexico the dead zone fluctuates in size each year, extending a record 8,500 square miles during the summer of 2002 and stretching over 7,700 square miles during the summer of 2010 (NRDC, 2013). With the increasing global population, more and more animal operations will be needed, and if the wastes don't get the appropriated treatment, the environmental problems will continue increasing. The biodigesters are a promising economic rentable and environmental friendly alternative to perform this treatment. Animal manure has a great potential for biogas production because of the methane content released in its degradation.

According to NREL, national laboratory of the U.S Department of Energy, the U.S, has a methane production potential of about 420 billion cubic feet per year, which could substitute 5% of current natural gas consumption in the electric power sector and 56 % of natural gas consumption in the transportation sector (EIA 2013). In addition, future predictions says that the country could increase this potential to 4.2 trillion cubic feet per year, that would correspond to 35 billion gallons of gasoline, which is three times more than current gasoline consumption (EIA 2013b). The state of Nebraska contribution in this national potential of production amount of methane comes 60% from animal manure.

In face of these facts, many countries around the world are now trying to find political alternatives in order to increase and incentive biogas' production. For example, the Institute of Science in Society states: "a comprehensive ecological tax reform law came into effect in Germany in March 1999 that raised taxes on energy sources tied to carbon emissions, and exempted renewables from taxation. In February 2000, the German parliament passed a Renewable Energies Sources Act that included payments for excess green energy generation fed back into the power grid". One other example came from the Chinese government in 2010 through which the Ministry of Agriculture promoted biogas digesters as a solution to manure treatment. This Ministry is administering a loan from the Asian Development Bank to increase the use of biogas technologies in livestock operations.

Nevertheless, the American path to reach a desirable use of biogas faces a bunch of policy-based constraints. It is possible to mention two bills that were introduced in a session of Congress and were not enacted. The first one is a bill written by Brian Higgins in 2009 (House resolution 1158: Biogas Production Incentive Act of 2009) that tried to promote biogas production and give credit for production of Biogas from certain renewable feedstock. In the same way, Ben Nelson, Nebraska's Senator, sponsored the bill S.306 that provides the same idea given by Brian Higgins and, as well as Brian's bill, this Senate resolution was not enacted.

Although the implementation of biodigesters might seem an expensive investment at beginning, predictions have shown that biogas is a great alternative for substituting fossil fuel, and is to be a very rentable, furthermore the environmental benefits caused by this practice is even greater. In comparison to other countries, there is still a lot that could be done in the U.S. to increase the biogas production and use its energetic potential as a renewable fuel. Since it is very difficult to impose that all animal operation in the country adopted the biogas production, perhaps all new CAFOs should receive some kind of incentive to install, or be required to have, a biodigester from the beginning. This way, the existing farms would end up, at some point, adopting the idea as well.